



**THE ECONOMIC IMPACT OF THE  
ENDANGERED SPECIES ACT  
ON THE  
AGRICULTURAL SECTOR**

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# **THE ECONOMIC IMPACT OF THE ENDANGERED SPECIES ACT ON THE AGRICULTURAL SECTOR**

by  
Stephen M. Meyer<sup>1</sup>

## **INTRODUCTION**

In my March 1995 working paper, *Endangered Species Listings and State Economic Performance*, I tested the widely held belief that endangered species protection has hobbled state economic development and performance. Since the number of species listed under the Endangered Species Act varies greatly among the states and has increased dramatically over the past twenty years the negative impact of the Act should be readily observable. Growth in gross state product and growth in construction employment were analyzed for signs of this negative impact: None were found. Based on the evidence of twenty years of data from fifty states – not simple anecdotes – the development community’s campaign against endangered species protection appears baseless.

Agricultural interests, including the forestry lobby, have been equally vocal in opposing endangered species protection, professing significant economic harm. Dean Kleckner, President of the American Farm Bureau Federation, argues: “...Farmers, ranchers, loggers, and others are being suffocated by the smothering land-use regulations required by the Act.”<sup>1</sup> Is American agriculture being suffocated by the Endangered Species Act? Has wildlife and habitat protection been paid for by “mortgaging the farm?”

This research paper looks for signs of the Endangered Species Act’s damaging effects on the agricultural sector. I use two indicators of agricultural sector “health”: (1) growth in the aggregate component of gross state product derived from farming, fisheries, and forestry; and (2) change in the value of farm real estate.<sup>2</sup>

These analyses follow the same format as those presented in *Endangered Species Listings and State Economic Performance*. Growth and change are measured over three consecutive five year periods: 1975-1980, 1980-1985, and 1985-1990. The number of listed species – state by state – at the beginning of a given period is used as the measure of relative burden for the Endangered Species Act.

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<sup>1</sup> The author is Professor in Political Science and Director of the Project on Environmental Politics and Policy at MIT. MIT internal resources fund this research.

## RESULTS

### ***The Agricultural Component of Gross State Product***

FIGURE 1 [page 7] consists of three graphs, one for each consecutive five-year period from 1975 to 1990. The number endangered species listed at the beginning of the five-year period is scaled along the bottom axis. Five year growth in the agricultural component of gross state product – including farming, fisheries, and forestry – is scaled along the left side. If the Endangered Species Act has significantly harmed agricultural economic performance then we should see a declining slope in the data as we move from left to right within each graph, and also as we move to each subsequent time period: States with larger numbers of listings should experience poorer performance.

Although the patterns are not very tight, it is readily apparent that the data do not exhibit this behavior. As the number of listed species increases agricultural sector economic growth rates remain basically flat. We do not see a consistent declining trend either within each time period or between them. There is no *prima facie* evidence supporting a negative effect.

Glancing at the far right side of the graphs it appears that geographically large states such as California and Texas exert a strong influence on the trend lines. Similarly, large states – measured in terms of population and economy – also seem to be influential. Accordingly, we turn to the statistical analysis summarized in TABLE 1. These regressions control for state area, size of economy (which is a surrogate for population as well), agricultural sector size, and extractive industry sector size. The table follows the same format as those presented in *Endangered Species Listings and State Economic Performance*, with one additional test reported at the bottom.

The key observation from the tests is that all three time periods suggest a *positive* relationship between endangered species listings and state economic performance in the agricultural sector. Each additional listing of species is associated with an increase in agricultural gross state product during the period of roughly 0.05% to 0.09%. Even if it were real this effect is so small that it is of no policy interest. Moreover, the statistics suggest we would be wise to assume that *no* systematic relationship exists at all (i.e., the results are statistically insignificant).<sup>3</sup> Nevertheless, this is strong evidence that the functional relationship between endangered species listings and agricultural performance cannot be negative as the opponents of the Endangered Species Act claim.<sup>4</sup>

**TABLE 1: Multiple Regression Analysis of the Impact of Endangered Species Listings on Growth in State Agricultural (Farm, Fisheries and Forestry) Economic Performance**

<b>PREDICTOR</b>	<b>PERIOD</b>		
	<b>1975-1980</b>	<b>1980-1985</b>	<b>1985-1990</b>
NUMBER of ENDANGERED SPECIES	0.09 (0.528)	0.08 (1.269)	0.05 (1.398)
Land Area	3.08* (2.399)	-2.53* (-2.200)	2.51*** (3.115)
Size of Economy	-2.09** (-2.977)	-0.55 (-0.637)	-2.90*** (-4.039)
Percent Extractive Industry	-0.34 (-0.244)	-2.11 (-1.187)	-1.08 (-1.228)
Percent of Economy in Agriculture	-5.56*** (-6.114)	-0.30 (-0.267)	-3.61*** (-4.643)
<i>N</i>	48	48	48
<i>R-SQR</i>	0.44	0.32	0.43
<i>Adj. R-SQR</i>	0.37	0.23	0.36
<i>Odds of an Negative Relationship</i>	1:16	1:55	1:71

\*  $p < 0.05$     \*\*  $p < 0.01$     \*\*\*  $p < 0.001$

TABLE 1 also presents a more sensitive and interesting test of the data, reported on the last line. This test asks the question: What are the odds that even a very slight negative relationship between endangered species listings and economic performance might exist – a relationship so slight that it is masked by noise in the data?<sup>5</sup> The table shows that in all instances the odds are *against* a negative relationship. Moreover the odds against a negative relationship increase from 1:16 to 1:71 over time. This is obviously not what we should see if “...Farmers, ranchers, loggers, and others are being suffocated by the smothering land-use regulations required by the Act.”

### **Farm Real Estate Values**

Next we look at farm real estate values for some indication of the insidious impact of endangered species protection on agriculture. If endangered species listings prevent farmers from using their land, then farm real estate values should reflect this. Farms in the most heavily burdened states should suffer weaker appreciation of – if not real reductions in – value compared to farms in states with fewer listings.

We should also expect farm real estate values to be more heavily affected in the later periods studied. The rapidly accumulating number of species listings should produce a growing burden and, thus, impose a larger penalty. Then too, as the American Farm Bureau Federation's president has correctly observed: "...Many of the listings occurring in the past few years have involved species whose range encompasses an entire region of the country."<sup>6</sup> So later listings should affect a larger number of properties and therefore be more harmful to state average farm real estate values.

TABLE 2 displays the results.<sup>7</sup> Here we find some evidence supporting the argument that during the early years of the Endangered Species Act listings may have been associated with depressed farm real estate values. The estimated coefficient for the period 1975-1980 is *negative* : -0.9. This implies that each new listing might have reduced farm real estate values by slightly less than 1% over the entire five-year period. Ten new species listings would have reduced values by 9%. The classical statistical significance test, however, counsels against accepting this number. There is a 40% chance that we would get this result (or one more negative) even when no true systematic relationship existed . And the odds test is completely neutral. There are just equal odds that even a minor underlying negative relationship exists. Still, this is the "strongest" evidence for an economically harmful effect that I have found.

But if this tentative result offers some solace for detractors of the Endangered Species Act the results for the subsequent two periods - and the overall results - are far less comforting. The coefficients for 1980-1985 and 1985-1990 are both positive, and the former is statistically significant. For 1980-1985 each new listing is associated with a 0.8% increase in farm real estate values. For 1985-1990 the associated increase would be just under 0.2%. The odds that the data mask a true underlying negative relationship of even marginal importance are 1:454 and 1:53, respectively. Given these results, if one is inclined to accept the hint of a negative impact in 1975-1980 then one must accept the even stronger suggestion of a positive relationship in subsequent years.

In either case it is clear that farm real estate values are not depressed by the last decade of expanded and wide-ranging endangered species protection. Neither the patterns within the individual periods nor the cross-period trends support the assertions of the farm lobby. Although endangered species protection has certainly imposed land-use restrictions on farmers those restrictions have not been of sufficient scope or magnitude to depress real estate values.

**TABLE 2: Multiple Regression Analysis of the Impact of Endangered Species Listings on Farm Real Estate Values**

<b>PREDICTOR</b>	<b>PERIOD</b>		
	<b>1975-1980</b>	<b>1980-1985</b>	<b>1985-1990</b>
NUMBER of ENDANGERED SPECIES	-0.941 (-0.818)	0.77* (2.387)	0.17 (0.777)
Land Area	17.442** (2.939)	1.338 (0.346)	-19.737*** (-6.935)
Size of Economy	-3.549* (-0.697)	-6.36 (-1.784)	2.08 (0.721)
Percent of Economy in Agriculture	-0.218 (-0.034)	-11.34* (-2.348)	0.65 (0.174)
<i>N</i>	48	48	48
<i>R-SQR</i>	0.27	0.24	0.62
<i>Adj. R-SQR</i>	0.20	0.16	0.59
<i>Odds of an Negative Relationship</i>	1:1	1:454	1:53

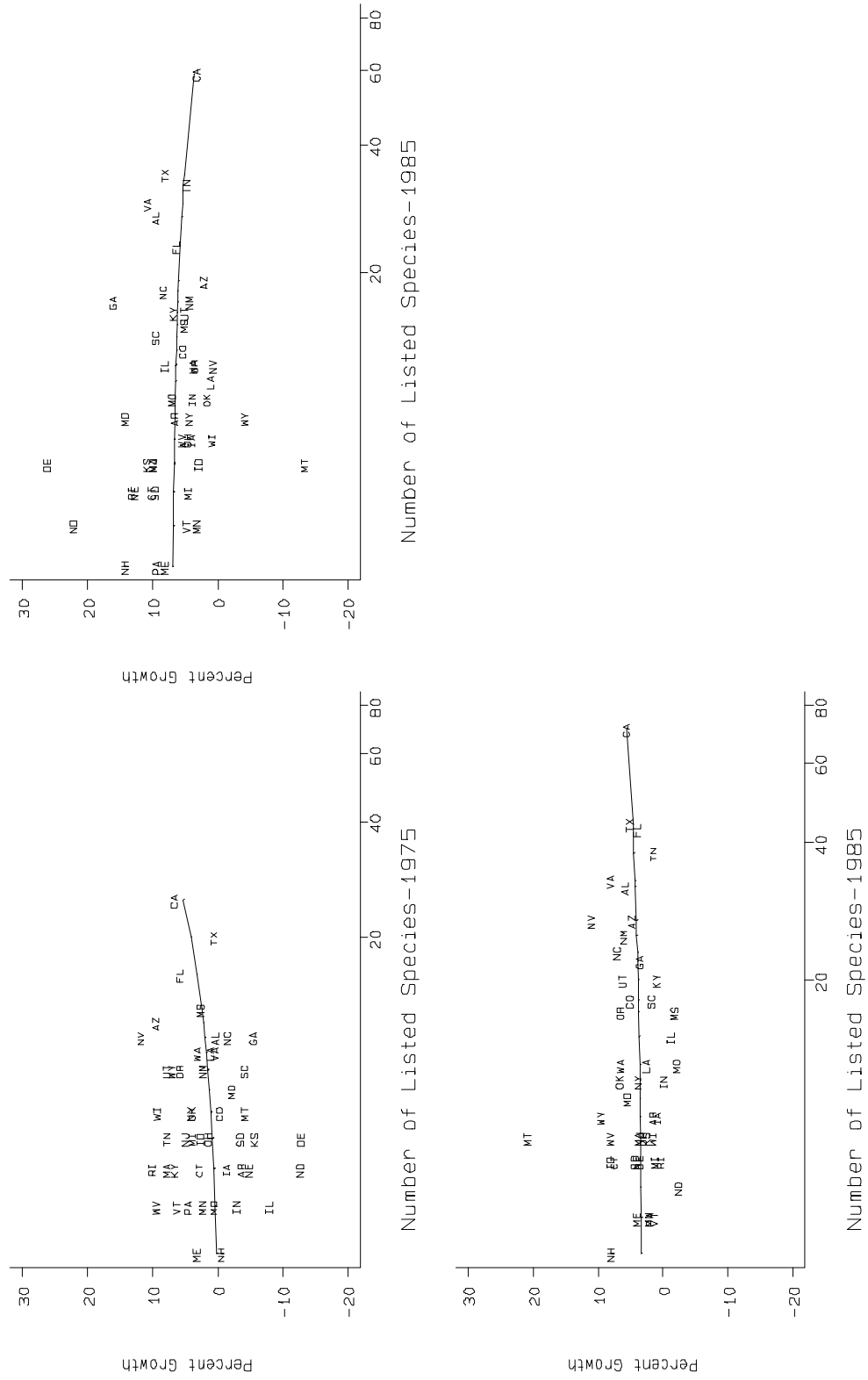
\*  $p < 0.05$     \*\*  $p < 0.01$     \*\*\*  $p < 0.001$

## Conclusion

The assertion that the Endangered Species Act has harmed the American farmer, hobbled agricultural production, and decimated the forest industry is baseless. The handful of horror stories that farm and forestry lobbyists feed to politicians and fling at the public are – at best (in the few instances in which they are true) – rare exceptions. For every real horror story there must be many thousands of comparable stories showing no harmful impact otherwise the cumulative effects would show up clearly in the economic data. They do not.

Correspondingly, congressional efforts to radically revise the Endangered Species Act on the premise that demolishing federal protection for endangered species will boost American agricultural output and stabilize farm real estate values are based on ignorance, not fact. No such benefits will follow. To the extent that distortions in implementing and enforcing the Endangered Species Act have harmed individual farmers or communities the isolated and limited nature of the effect as implied by the data suggests that they can be effectively addressed by administrative regulatory reforms such as those recently implemented by the Interior Department.

FIGURE 1: Growth in Gross State Product from Agriculture, Forestry, & Fisheries versus Species Listings



## ENDNOTES

<sup>1</sup> Statement to the Endangered Species Task Force of the House Resources Committee, May 18, 1995.

<sup>2</sup> Deflated time series data for the agricultural component of gross state product were provided by the Bureau of Economic Analysis, Department of Commerce. Growth is measured as percent changed over the five year period.

Farm real estate value is the average value of land and buildings per acre of farm land by state. Farm real estate data were obtained from the U.S. Department of Agriculture, Economic Research Bureau, series on *Agricultural Resources, Agricultural Land Values and Markets Situation and Outlook Report*.

<sup>3</sup> The reported significance test numbers presented in this paper differ very slightly from those presented in a earlier version. These regressions use White's method correcting for heteroskedasticity in the data. This method is more conservative. The coefficients and the results remain unchanged.

<sup>4</sup> If a negative causal relationship exists *then there must be an observable negative association* which there is not. Correlation cannot prove causation, but absence of correlation can disprove causation.

<sup>5</sup> This test looks at the differences between the top 20% and bottom 20% of the states in terms of economic performance and endangered species listings and calculates the corresponding rate of change of the former over the latter. Specifying even a 10% reduction of that slope as "significant" (for policy) a one-way post-hoc test of the endangered species coefficient is carried out.

<sup>6</sup> Source: see endnote 1.

<sup>7</sup> The control variable for Extractive Industry is dropped from these analyses since it is not relevant to the hypothesis being tested. Nonetheless, when retained it shows no effect and does not alter the results. Similarly, a control variable for the average acreage of farms by state was examined in these regressions and found to have no effect.